

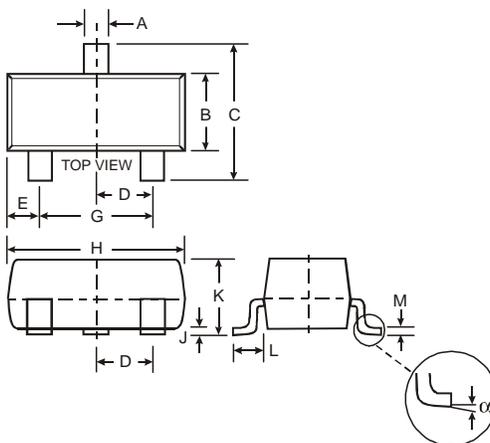
## Features

- Epitaxial Planar Die Construction
- Complementary NPN Types Available (DDTC)
- Built-In Biasing Resistors, R1≠R2
- **Lead, Halogen and Antimony Free, RoHS Compliant "Green" Device (Notes 1 and 2)**

## Mechanical Data

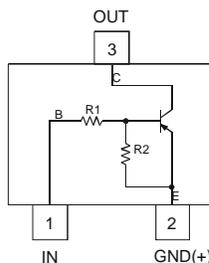
- Case: SOT-23
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminal Connections: See Diagram
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Marking and Date Code: See Table Below & Page 4
- Ordering Information: See Page 4
- Weight: 0.008 grams (approximate)

P/N	R1 (NOM)	R2 (NOM)	MARKING
DDTA113ZCA	1KΩ	10KΩ	P02
DDTA123YCA	2.2KΩ	10KΩ	P05
DDTA123JCA	2.2KΩ	47KΩ	P06
DDTA143XCA	4.7KΩ	10KΩ	P09
DDTA143FCA	4.7KΩ	22KΩ	P10
DDTA143ZCA	4.7KΩ	47KΩ	P11
DDTA114YCA	10KΩ	47KΩ	P14
DDTA114WCA	10KΩ	4.7KΩ	P15
DDTA124XCA	22KΩ	47KΩ	P18
DDTA144VCA	47KΩ	10KΩ	P21
DDTA144WCA	47KΩ	22KΩ	P22

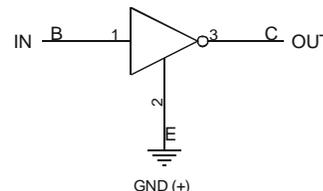


SOT-23		
Dim	Min	Max
A	0.37	0.51
B	1.20	1.40
C	2.30	2.50
D	0.89	1.03
E	0.45	0.60
G	1.78	2.05
H	2.80	3.00
J	0.013	0.10
K	0.903	1.10
L	0.45	0.61
M	0.085	0.180
α	0°	8°

All Dimensions in mm



Schematic and Pin Configuration



Equivalent Inverter Circuit

## Maximum Ratings @<sub>TA</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Supply Voltage, (3) to (2)	V <sub>CC</sub>	-50	V
Input Voltage, (1) to (2)	V <sub>IN</sub>	+5 to -10 +5 to -12 +5 to -12 +7 to -20 +6 to -30 +5 to -30 +6 to -40 +10 to -30 +10 to -40 +15 to -40 +10 to -40	V
Output Current	I <sub>O</sub>	-100 -100 -100 -100 -100 -100 -70 -100 -50 -30 -30	mA
Output Current	I <sub>C</sub> (Max)	-100	mA

Notes: 1. No purposefully added lead. Halogen and Antimony Free.  
2. Product manufactured with Data Code V9 (week 33, 2008) and newer are built with Green Molding Compound. Product manufactured prior to Date Code V9 are built with Non-Green Molding Compound and may contain Halogens or Sb<sub>2</sub>O<sub>3</sub> Fire Retardants.

## Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation	$P_d$	200	mW
Thermal Resistance, Junction to Ambient Air (Note 3)	$R_{\theta JA}$	625	$^{\circ}\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_j, T_{STG}$	-55 to +150	$^{\circ}\text{C}$

Notes: 3. Mounted on FR4 PC Board with recommended pad layout at <http://www.diodes.com/datasheets/ap02001.pdf>.

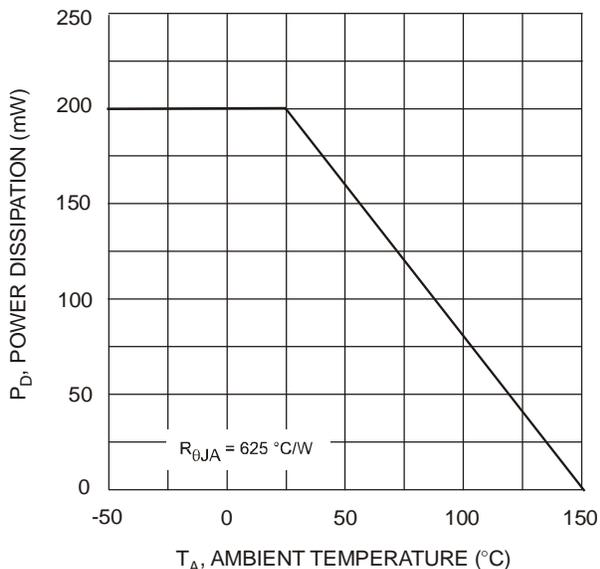
## Electrical Characteristics @ $T_A = 25^{\circ}\text{C}$ unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	$V_{I(off)}$	-0.3			V	$V_{CC} = 5\text{V}, I_O = 100\mu\text{A}$
		-0.3				
		-0.5				
		-0.3				
		-0.3				
		-0.5	—	—		
		-0.3				
		-0.8				
		-0.4				
		-1.0				
		-0.8				
Input Voltage	$V_{I(on)}$			-3.0	V	$V_O = -0.3\text{V}, I_O = -20\text{mA}$ $V_O = -0.3\text{V}, I_O = -20\text{mA}$ $V_O = -0.3\text{V}, I_O = -5\text{mA}$ $V_O = -0.3\text{V}, I_O = -20\text{mA}$ $V_O = -0.3\text{V}, I_O = -3\text{mA}$ $V_O = -0.3\text{V}, I_O = -5\text{mA}$ $V_O = -0.3\text{V}, I_O = -1\text{mA}$ $V_O = -0.3\text{V}, I_O = -2\text{mA}$ $V_O = -0.3\text{V}, I_O = -2\text{mA}$ $V_O = -0.3\text{V}, I_O = -2\text{mA}$ $V_O = -0.3\text{V}, I_O = -2\text{mA}$
				-3.0		
				-1.1		
				-2.5		
				-1.3		
			—	—		
				-1.3		
				-1.4		
				-3.0		
				-2.5		
				-5.0		
		-4.0				
Output Voltage	$V_{O(on)}$	—	-0.1	-0.3	V	$I_O/I_I = -5\text{mA}/-0.25\text{mA}$ DDTA123JCA $I_O/I_I = -5\text{mA}/-0.25\text{mA}$ DDTA143ZCA $I_O/I_I = -5\text{mA}/-0.25\text{mA}$ DDTA114YCA $I_O/I_I = -10\text{mA}/-0.5\text{mA}$ All Others
Input Current	$I_I$			-7.2	mA	$V_I = -5\text{V}$
				-3.8		
				-3.6		
				-1.8		
				-1.8		
			—	—		
				-1.8		
				-0.88		
				-0.88		
				-0.36		
				-0.16		
		-0.16				
Output Current	$I_{O(off)}$	—	—	-0.5	$\mu\text{A}$	$V_{CC} = -50\text{V}, V_I = 0\text{V}$
DC Current Gain	$G_I$	-33			—	$V_O = -5\text{V}, I_O = -10\text{mA}$
		-33				
		-80				
		-30				
		-68				
		-80	—	—		
		-68				
		-24				
		-68				
		-33				
		-56				
Input Resistor Tolerance	$\Delta R_1$	-30	—	+30	%	—
Resistance Ratio Tolerance	$\Delta R_2/R_1$	-20	—	+20	%	—
Gain-Bandwidth Product*	$f_T$	—	250	—	MHz	$V_{CE} = -10\text{V}, I_E = 5\text{mA}, f = 100\text{MHz}$

\* Transistor - For Reference Only

**Typical Curves – DDTA123JCA**

NEW PRODUCT



$T_A$ , AMBIENT TEMPERATURE ( $^{\circ}C$ )  
Fig. 1 Derating Curve

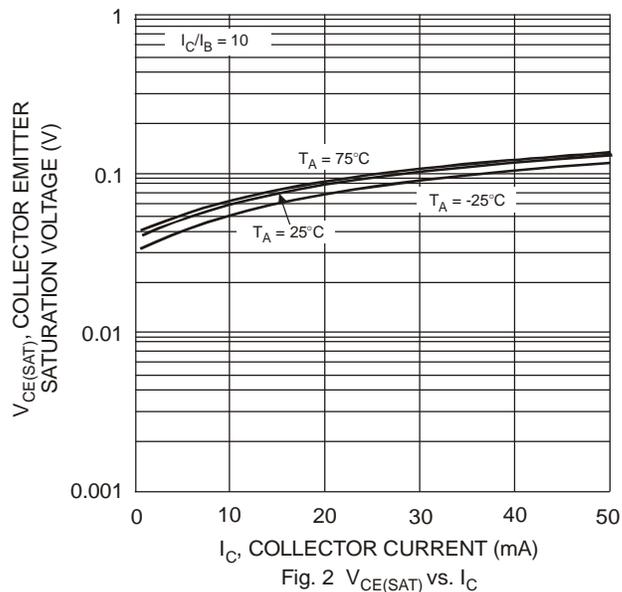
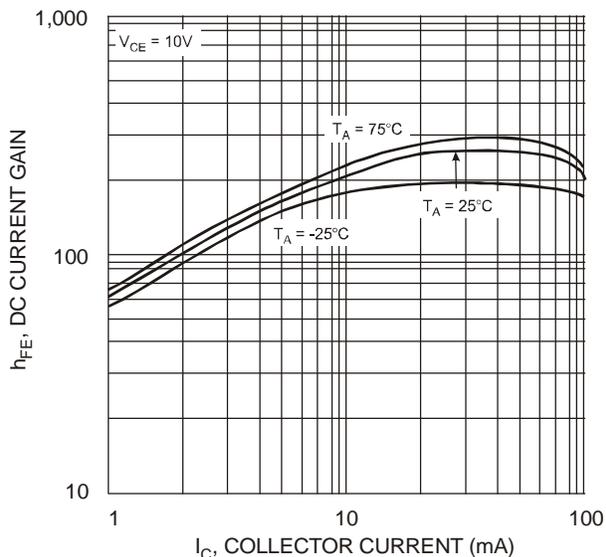


Fig. 2  $V_{CE(SAT)}$  vs.  $I_C$



$I_C$ , COLLECTOR CURRENT (mA)  
Fig. 3 DC Current Gain

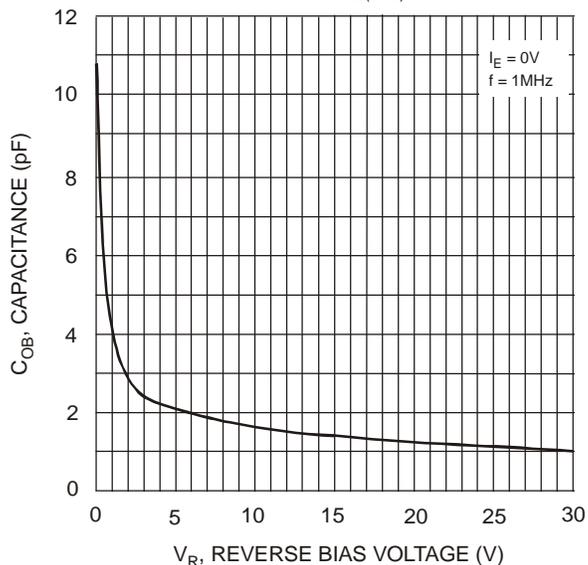


Fig. 4 Output Capacitance

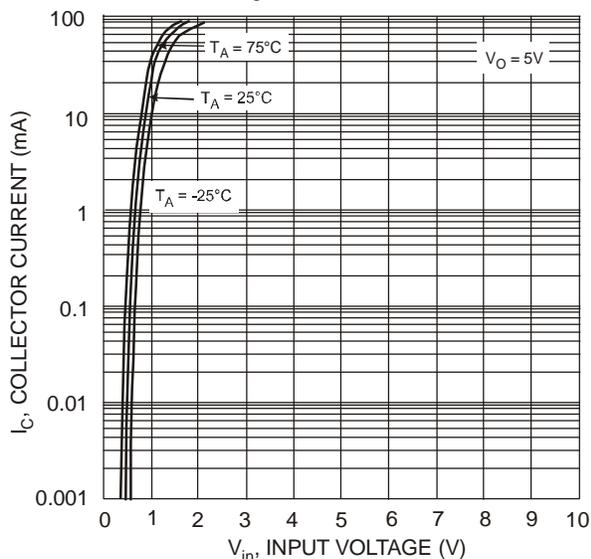


Fig. 5 Collector Current vs. Input Voltage

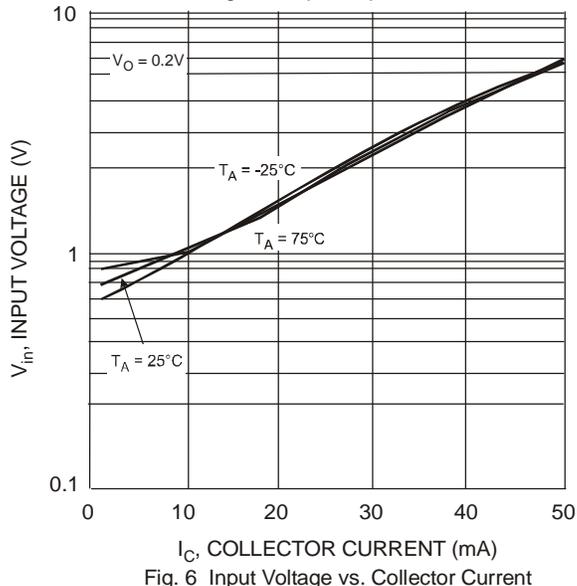


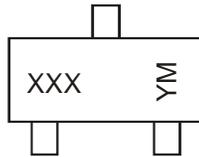
Fig. 6 Input Voltage vs. Collector Current

## Ordering Information (Note 4)

Device	Packaging	Shipping
DDTA113ZCA-7-F	SOT-23	3000/Tape & Reel
DDTA123YCA-7-F	SOT-23	3000/Tape & Reel
DDTA123JCA-7-F	SOT-23	3000/Tape & Reel
DDTA143XCA-7-F	SOT-23	3000/Tape & Reel
DDTA143FCA-7-F	SOT-23	3000/Tape & Reel
DDTA143ZCA-7-F	SOT-23	3000/Tape & Reel
DDTA114YCA-7-F	SOT-23	3000/Tape & Reel
DDTA114WCA-7-F	SOT-23	3000/Tape & Reel
DDTA124XCA-7-F	SOT-23	3000/Tape & Reel
DDTA144VCA-7-F	SOT-23	3000/Tape & Reel
DDTA144WCA-7-F	SOT-23	3000/Tape & Reel

Notes: 4. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information



XXX = Product Type Marking Code, See Table on Page 1  
 YM = Date Code Marking  
 Y = Year ex: T = 2006  
 M = Month ex: 9 = September

### Date Code Key

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012
Code	R	S	T	U	V	W	X	Y	Z

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

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